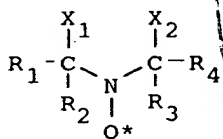


CLAIMS

What is claimed is:

1. In a process for the production and purification of unsaturated monomers employing nitroxyl-containing inhibitors wherein process streams containing the inhibitor are recycled, the improvement that comprises recycling said streams at a reboiler temperature no higher than about 110° C. *step.*

2. The process of claim 1 wherein the nitroxyl-containing inhibitor is of the following structural formula:



wherein

R_1 and R_4 are independently selected from the group consisting of hydrogen, alkyl, and heteroatom-substituted alkyl;

R_2 and R_3 are independently selected from the group consisting of alkyl and heteroatom-substituted alkyl; and

X_1 and X_2

(1) are independently selected from the group consisting of halogen, cyano, amido, -S- C_6H_5 , carbonyl, alkenyl, alkyl of 1 to 15 carbon atoms, $COOR_7$, -S-COR₇, and -OCOR₇, wherein R_7 is alkyl or aryl, or
(2) taken together, form a ring structure with the nitrogen.

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- 1 3. The process of claim 1 wherein said monomers contain impurities from the
2 monomer production and/or purification processes.
- 1 4. The process of claim 3 wherein the impurities include polymer formed during
2 the production and/or purification processes.
- 1 5. The process of claim 4 wherein the polymer formed during the production
2 and/or purification processes is soluble in the monomer stream.
- 1 6. The process of claim 4 wherein the polymer formed during the production
2 and/or purification processes is insoluble in the monomer stream.
- 1 7. The process of claim 1 wherein said monomers are undergoing purification by
2 distillation.
- 1 8. The process of claim 7 wherein the distillation process occurs at pressures less
2 than 760 mm Hg.
- 1 9. The process of claim 7 wherein the distillation process is a continuous process.
- 1 10. The process of claim 4 wherein the equipment in which the distillation process
2 occurs contains polymer.

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1 11. The process of claim 10 wherein the polymer was formed during the
2 monomer's production and/or purification processes.

1 12. The process of claim 10 wherein the polymer is not dissolved in the monomer
2 stream.

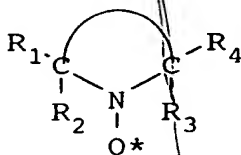
1 13. The process of claim 7 wherein said monomers contain impurities from the
2 monomer production and/or purification processes.

1 14. The process of claim 13 wherein the impurities include polymer formed during
2 the production and/or purification processes.

1 15. The process of claim 14 wherein the polymer formed during the production
2 and/or purification processes is soluble in the monomer stream.

1 16. The process of claim 14 wherein the polymer formed during the production
2 and/or purification processes is insoluble in the monomer stream.

1 17. The process of claim 2 wherein the nitroxyl-containing inhibitor is of the
2 structure



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wherein R_1 and R_4 are independently selected from the group consisting of hydrogen, alkyl, and heteroatom-substituted alkyl and R_2 and R_3 are independently selected from the group consisting of alkyl and heteroatom-substituted alkyl, and the

portion represents the atoms necessary to form a five-, six-, or seven-membered heterocyclic ring.

18. The process of claim 2 wherein the inhibitor is a blend of two nitroxyls.

19. The process of claim 17 wherein the inhibitor contains one or more nitroxyls selected from the group consisting of:

N,N-di-*tert*-butylnitroxide;

N,N-di-*tert*-amylnitroxide;

N-*tert*-butyl-2-methyl-1-phenyl-propylnitroxide;

N-*tert*-butyl-1-diethylphosphono-2,2-dimethylpropylnitroxide;

2,2,6,6-tetramethyl-piperidinyloxy;

4-amino-2,2,6,6-tetramethyl-piperidinyloxy;

4-hydroxy-2,2,6,6-tetramethyl-piperidinyloxy;

4-oxo-2,2,6,6-tetramethyl-piperidinyloxy;

4-dimethylamino-2,2,6,6-tetramethyl-piperidinyloxy;

4-ethanoyloxy-2,2,6,6-tetramethyl-piperidinyloxy;

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- 13 2,2,5,5-tetramethylpyrrolidinyloxy;
14 3-amino-2,2,5,5-tetramethylpyrrolidinyloxy;
15 2,2,4,4-tetramethyl-1-oxa-3-azacyclopentyl-3-oxy;
16 2,2,4,4-tetramethyl-1-oxa-3-pyrrolinyl-1-oxy-3-carboxylic acid;
17 2,2,3,3,5,5,6,6-octamethyl-1,4-diazacyclohexyl-1,4-dioxy;
18 4-bromo-2,2,6,6-tetramethyl-piperidinyloxy;
19 4-chloro-2,2,6,6-tetramethyl-piperidinyloxy;
20 4-iodo-2,2,6,6-tetramethyl-piperidinyloxy;
21 4-fluoro-2,2,6,6-tetramethyl-piperidinyloxy;
22 4-cyano-2,2,6,6-tetramethyl-piperidinyloxy;
23 4-carboxy-2,2,6,6-tetramethyl-piperidinyloxy;
24 4-carbomethoxy-2,2,6,6-tetramethyl-piperidinyloxy;
25 4-carbethoxy-2,2,6,6-tetramethyl-piperidinyloxy;
26 4-cyano-4-hydroxy-2,2,6,6-tetramethyl-piperidinyloxy;
27 4-methyl-2,2,6,6-tetramethyl-piperidinyloxy;
28 4-carbethoxy-4-hydroxy-2,2,6,6-tetramethyl-piperidinyloxy;
29 4-hydroxy-4-(1-hydroxypropyl)-2,2,6,6-tetramethyl-piperidinyloxy;
30 4-methyl-2,2,6,6-tetramethyl-1,2,5,6-tetrahydropyridine -1-oxyl;
31 4-carboxy-2,2,6,6-tetramethyl-1,2,5,6-tetrahydropyridine -1-oxyl;
32 4-carbomethoxy-2,2,6,6-tetramethyl-1,2,5,6-tetrahydropyridine -1-oxyl;
33 4-carbethoxy-2,2,6,6-tetramethyl-1,2,5,6-tetrahydropyridine -1-oxyl;
34 4-amino-2,2,6,6-tetramethyl-1,2,5,6-tetrahydropyridine -1-oxyl;
35 4-amido-2,2,6,6-tetramethyl-1,2,5,6-tetrahydropyridine -1-oxyl;

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- 36 3,4-diketo-2,2,5,5-tetramethylpyrrolidinyloxy;
- 37 3-keto-4-oximino-2,2,5,5-tetramethylpyrrolidinyloxy;
- 38 3-keto-4-benzylidene-2,2,5,5-tetramethylpyrrolidinyloxy;
- 39 3-keto-4,4-dibromo-2,2,5,5-tetramethylpyrrolidinyloxy;
- 40 2,2,3,3,5,5-hexamethylpyrrolidinyloxy;
- 41 3-carboximido-2,2,5,5-tetramethylpyrrolidinyloxy;
- 42 3-oximino-2,2,5,5-tetramethylpyrrolidinyloxy;
- 43 3-hydroxy-2,2,5,5-tetramethylpyrrolidinyloxy;
- 44 3-cyano-3-hydroxy-2,2,5,5-tetramethylpyrrolidinyloxy;
- 45 3-carbomethoxy-3-hydroxy-2,2,5,5-tetramethylpyrrolidinyloxy;
- 46 3-carbethoxy-3-hydroxy-2,2,5,5-tetramethylpyrrolidinyloxy;
- 47 2,2,5,5-tetramethyl-3-carboxamido-2,5-dihydropyrrole-1-oxyl;
- 48 2,2,5,5-tetramethyl-3-amino-2,5-dihydropyrrole-1-oxyl;
- 49 2,2,5,5-tetramethyl-3-carbethoxy-2,5-dihydropyrrole-1-oxyl;
- 50 2,2,5,5-tetramethyl-3-cyano-2,5-dihydropyrrole-1-oxyl;
- 51 bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)succinate;
- 52 bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)adipate;
- 53 bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)sebacate;
- 54 bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)n-butylmalonate;
- 55 bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)phthalate;
- 56 bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)isophthalate;
- 57 bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)terephthalate;
- 58 bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)hexahydroterephthalate;

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- 59 N,N'-bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)adipamide;
60 N-(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)-caprolactam;
61 N-(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)-dodecylsuccinimide;
62 2,4,6-tris-[N-butyl-N-(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)]-s-triazine; and
63 4,4'-ethylenebis(1-oxyl-2,2,6,6-tetramethylpiperazin-3-one).

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